OVERVIEW: Manual Plating Process

Plating Process:

•Pour glass beads onto bioassay plate.
•Pipette solution onto bioassay plate.
•Stack 4-5 plates together.
•Shake and rock the plates until the beads evenly spread the solution across the agarose gel on the plate.
•Remove the glass beads.

Purpose of Plating:

•“Sub-clone sheared fragments” which means to grow millions of copies of bacterial colonies

Plating Stats:

•9”x9” bioassay plates
•Weight: 1.2lbs/plate (low profile) or 1.4lbs/plate (high profile)
•40 plates per batch
•4-5 plates per cycle
•1-2 minute shake time per cycle
•Approx. 100 efforts/minute
•Total processing time 40 minutes

Evolution of Shake’n Plate

BEFORE

CURRENT INTERVENTION

FUTURE
Testing Automated System (in Progress)

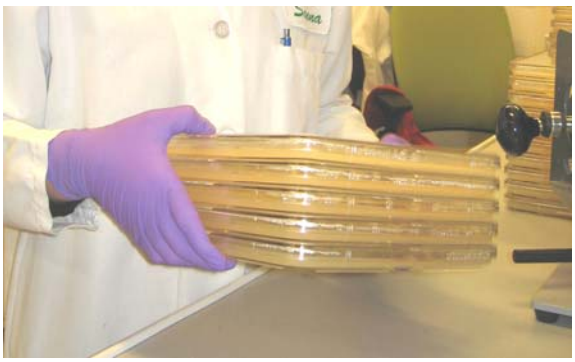
- Manual process "plating" is a high risk task (Strain Index = 60.8).
- Solutions were initiated by production line operators’ participation in the Ergonomics Working Group.
- These solutions eliminated sustained gripping of the sample plates, reduced the Strain Index to a ‘safe’ score of 2.3, and increased throughput by 25%.

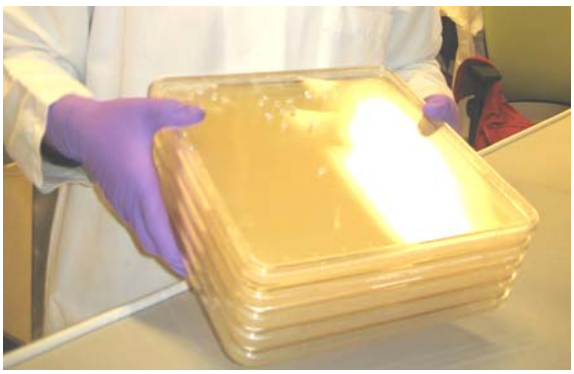
This work was performed under the auspices of the US Department of Energy’s Office of Science, Biological and Environmental Research Program, and by the University of California, Lawrence Livermore National Laboratory under Contract No. W-7405-Eng-48, Lawrence Berkeley National Laboratory under contract No. DE-AC02-05CH11231 and Los Alamos National Laboratory under contract No. DE-AC02-06NA25396.

BEFORE: Manual Plating Process

Problem

- Risk Factors:
  - High grip force when handling 5 plates/cycle
  - Wide (4”) grip span (low profile)
  - Grip Force 30-41% of maximum voluntary contraction; Moore-Garg Strain Index = 40.5
- Musculoskeletal Problems:
  - Awkward hand and wrist postures to repeatedly tilt and rotate the plates for 40 min/batch
  - Reports of discomfort and fatigue in operators in upper extremities, shoulders, and back.
- Workstation Layout:
  - Conducted at a fume hood in a high traffic walkway
  - Does not accommodate a sitting workstation due to the lack of leg clearance.
- Process Efficiency:
  - 4 plates per cycle manually, limited by weight (8-10lbs) & awkward grip of plates





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